

Claims

1. Nozzle arrangement (12) for extruding doughy substances, comprising
- 5 - two inner nozzles (14, 16) for extruding at least one inner substance (26; 98; 112, 114; 168, 170), and
- two outer nozzles (18, 20) for extruding at least one outer substance (28; 100, 102; 110; 172, 174), characterized in that the outer nozzles (18, 20) each
- 10 surround an inner nozzle (14, 16) with clearance, and all of the nozzles (14, 16, 18, 20) are rotatable about a common axis of rotation (148).
2. Nozzle arrangement according to claim 1,
- 15 characterized in that the inner nozzles (14, 16) each have a mouth (44, 46) and the outer nozzles (18, 20) each have a mouth (36, 38), wherein the mouths (36, 38) of the outer nozzles (18, 20) are disposed in flow direction downstream of the mouths (44, 46) of
- 20 the inner nozzles (14, 16).
3. Nozzle arrangement according to claim 2,
- characterized in that the outer nozzles (18, 20) at the level of the mouths (44, 46) of the inner nozzles
- 25 (14, 16) are narrowed in the direction of flow of the substances.
4. Nozzle carrier (10) for extruding doughy substances, characterized in that it comprises a nozzle
- 30 arrangement (12) according to one of claims 1 to 3 and a stator (60), in which a first (68) and second feed channel (78) are formed, and comprises a rotor (22), which carries the nozzles (14, 16, 18, 20), is

rotatably supported in the stator (60) and in which two connection channels (70, 72) are formed, which connect the first feed channel (68) in each case to an inner nozzle (14, 16), wherein between stator (60) and rotor (22) an annular space (76) is formed, which connects the second feed channel (78) to the two outer nozzles (18, 20) (Fig. 1).

5. Nozzle carrier according to claim 4,
characterized in that the rotor (22) is sealed relative to the stator (60) by means of a first (86) and second seal (84), wherein the first seal (86) seals off the first feed channel (68) and the first (86) and second seal (84) seal off the annular space (76).
6. Nozzle carrier (10) for extruding doughy substances, characterized in that it comprises a nozzle arrangement (12) according to one of claims 1 to 3 and a stator (60), in which a first (68), second (78) and third feed channel (88) are formed, and comprises a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and in which two connection channels (70, 72) are formed, which connect the first feed channel (68) in each case to an inner nozzle (14, 16), wherein between the stator (60) and the rotor (22) a first annular space (76) is formed, which connects the second feed channel (78) to a first outer nozzle (18), and a second annular space (90) is formed, which connects the third feed channel (88) to the second outer nozzle (20) (Fig. 4).

7. Nozzle carrier (10) for extruding doughy substances, characterized in that it comprises a nozzle arrangement (12) according to one of claims 1 to 3 and a stator (60), in which a first (68), second (78) and third feed channel (88) are formed, and comprises a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and in which a first connection channel (70) is formed, which connects the first feed channel (68) to the first inner nozzle (14), wherein between the stator (60) and the rotor (22) a first annular space (76) and in the rotor (22) a second connection channel (72) are formed, which connect the second feed channel (78) to the second inner nozzle (16), and between the stator (60) and the rotor (22) a second annular space (90) is formed, which connects the third feed channel (88) to the outer nozzles (18, 20) (Fig. 7).

8. Nozzle carrier according to one of claims 6 or 7, characterized in that between the rotor (22) and the stator (60) a first (86), second (116) and third seal (84) is disposed, wherein the first seal (86) seals off the first connection channel (70), the first (86) and second seal (116) seal off the first annular space (76), and the second (116) and third seal (84) seal off the second annular space (90).

9. Nozzle carrier for extruding doughy substances, characterized in that it comprises a nozzle arrangement (12) according to one of claims 1 to 3 and a stator (60), in which a first (68), second (78), third (88) and fourth feed channel (176) are formed,

and comprises a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and in which a first connection channel (70) is formed, which connects the first feed channel (68) to the second inner nozzle (16), wherein between the stator (60) and the rotor (22) a first annular space (76) and in the rotor (22) a second connection channel (93) are formed, which connect the second feed channel (78) to a first outer nozzle (18), between the stator (60) and the rotor (22) a second annular space (90) is formed, which connects the third feed channel (88) to the second outer nozzle (20), and between the stator (60) and the rotor (22) a third annular space (186) and in the rotor (22) a third connection channel (70) are formed, which connect the fourth feed channel (176) to the first inner nozzle (14) (Fig. 20).

10. Nozzle carrier according to claim 9, characterized in that between the rotor (22) and the stator (60) a first (86), second (188), third (116) and fourth seal (84) is disposed, wherein the first seal (86) seals off the first feed channel (68), the first (86) and second seal (188) seal off the third annular space (186), and the second (188) and third seal (116) seal off the first annular space (76), and the third (116) and fourth seal (84) seal off the third annular space (90).

11. Nozzle carrier according to one of claims 4 to 10, characterized in that the axis of rotation (148) of

the rotor (22) is the centre line of the nozzles (14, 16, 18, 20).

12. Nozzle carrier according to one of claims 4 to 11,
5 characterized in that the annular space(s) (76, 90) in longitudinal section is (are) in sections circular or elliptical in shape.

13. Nozzle carrier according to one of claims 4 to 12,
10 characterized in that the rotor (22) in the region of the/an annular space (90) is designed (52e) in such a way that during rotation it simultaneously conveys the substance situated in the annular space (90).

15 14. Nozzle carrier according to one of claims 4 to 13, characterized in that the rotor (22) in the region of the/an annular space (90) is in cross section of a flattened oval design (52e).

20 15. Device for extruding doughy substances, characterized in that at least one nozzle carrier (10) according to one of claims 4 to 14 is provided, and the rotor (22) is drivable by means of a traction mechanism gearing, in particular a toothed belt drive
25 (136, 138), or a toothed gearing (136, 152, 154) with intersecting axes (148, 150).

16. Device according to claim 15,
30 characterized in that a plurality of nozzle carriers (10) are disposed side by side and are drivable by means of a single traction mechanism gearing, in particular a toothed belt drive (136, 138), or a

17. Device according to claim 15 or 16,
5 characterized in that the nozzle carrier(s) is (are)
disposed so as to be inclined at an angle α of around
25° to the vertical.